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PART II:

DEPARTMENT OF THE INTERIOR

Mining Enforcement and Safety Administration

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UNDERGROUND COAL MINES

Illumination Systems; Promulgation Date, and Testing and Evaluation Procedures

DEPARTMENT OF THE INTERIOR

Mining Enforcement and Safety Administration

[30 CFR Part 75]

UNDERGROUND COAL MINES

Date on Which Illumination Standards for Working Places Will be Promulgated

Section 317(e) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 783, 30 U.S.C. 877(e)) directed the Secretary of the Interior to propose standards by December 31, 1970, under which all working places in a coal mine shall be illuminated by permissible lighting while persons are working in such places.

Proposed standards were published in the FEDERAL REGISTER for December 31, 1970 (35 FR 20009). Because of written comments, suggestions, and objections received in response to the proposed standards and at subsequent consultation meetings the proposed standards of December 31, 1970 were withdrawn.

Revised illumination standards were proposed and published in the FEDERAL REGISTER for Wednesday, October 27, 1971 (36 FR 20607). Written comments, suggestions, and objections were received and a public hearing was held on April 4, 1974 (39 FR 8618). Findings of fact were made and published in the FEDERAL REGISTER for Friday, June 28, 1974 (39 FR 24021). Although it was found that technology existed and practical stationary and machine mounted lighting systems for self-propelled mining equipment (including longwall mining equipment) had been developed which would illuminate underground working places to 0.06 footlamberts, a thorough and complete review of the proposed standards revealed complex problems in application of the existing technology to the diverse types of machinery used and the widely varying conditions in coal mines. A complex engineering ability was essential in order to make illumination measurements underground with the then existing light measuring instruments. It was apparent that to implement and enforce the standards would require an inordinate amount of an inspector's time to make accurate measurements of the illumination provided using then existing light measuring instruments. Easily useable and reliable light measuring instruments and techniques were not available. It was further recognized that there was a scarcity of illumination engineering expertise in the coal mining industry and in the mining equipment and illumination equipment manufacturing industries.

In the interim since the standards were proposed the Mining Enforcement and Safety Administration (MESA) has continued research on the practical application of illumination technology to the diverse mining conditions and types of equipment used. A less intricate and complicated light measuring instrument has been developed for use by inspectors, and a less complex light measuring method has been developed in making illumination measurements underground to determine whether the required illumination is being provided.

MESA is convinced that technology exists to test and evaluate illumination systems in a simulated working place and to accurately predict the performance of the system prior to installation and use underground if the system is installed, used, and operated in accordance with the designs for the machine upon which the illumination systems are to be installed and within the conditions and parameters established through testing and evaluation in a simulated working place. Testing and evaluation may also be accomplished underground under acutal working conditions existing in a coal mine or at simulated working places constructed by equipment manufacturers.

MESA has constructed a simulated working place and is prepared to test and evaluate illumination systems for coal mine operators, mining machinery manufacturers, and lighting and equipment manufacturers. Concurrent with this Notice there is published in this issue of the FEDERAL REGISTER at page 14108 a Notice of the testing and evaluation of illumination systems which is now available through and which can be performed by Technical Support of MESA to assist mine operators and equipment manufacturers to meet the final standards which are to be promulgated.

Section 317(e) of the Act further provides that all working places in a mine shall be illuminated within eighteen months after the promulgation of the standards. Section 101(h) of the Act provides that any mandatory safety standard promulgated under section 101 shall be effective upon publication in the FEDERAL REGISTER unless the Secretary specifies a later effective date. The Department is of the opinion that under the language of these two sections publication of the illumination standards at this time as final standards would constitute "promulgation" of the standards and that the eighteen month period must commence to run when the final mandatory standards are promulgated by publication in the FEDERAL REGISTER.

Illumination of working places in an underground coal mine has been a new field involving new technology and hardware which had to be developed. Manufacturers and operators have been reluctant to develop, install, test and evaluate illumination systems without knowing what the final standards will require. Such systems which have been installed and tried in mines have been only prototype systems and a lead time is necessary to test and evaluate the systems against the standards and thereafter tool up, manufacture, distribute and install the system. Many machines operating in mines will require custom designed systems which will impose an additional strain upon the expertise available. Mine operators and lighting and equipment manufacturers have complained that they are unable to design and engineer lighting systems without prior knowledge of the illumination requirements and the methods of measuring illumination which will be used by MESA. The Department is of the view that to promulgate the final standards at this time would deprive operators of a substantial portion of the eighteen month period within which to provide the required illumination. A reasonable lead time of six months should be provided which will enable operators and manufacturers to engineer, develop, manufacture, test and evaluate, and install illumination systems which will meet the requirements of the standards within the eighteen month period established by Congress.

Notice is hereby given that on October 1, 1976, the Secretary of the Interior will promulgate by publication in the FEDERAL REGISTER the final standards under which within eighteen months after the standards are promulgated all working places in a mine shall be illuminated by permissible lighting.

The form and substance of the standards which will be promulgated on October 1, 1976 are set forth below, together with the reasons for revisions, modifications, or changes which have been made in the proposed standards.

Interested persons are advised that the standards which will be promulgated are firm and that no further change or revision is contemplated or intended.

Dated: March 24, 1976.

WILLIAM L. FISHER,
Assistant Secretary of the Interior.

ILLUMINATION IN UNDERGROUND COAL MINES

Background. Section 317(e) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 788; 30 U.S.C. 877(e)) directed the Secretary of the Interior within nine months after March 30, 1970, to propose standards under which all working places in a mine shall be illuminated by permissible lighting while persons are working in such places. Section 317(e) further provides that such working places shall be illuminated within eighteen months after such standards are promulgated.

Pursuant to authority under section 101 of the Act (30 U.S.C. 811) and in accordance with section 317(e), there was published in the FEDERAL REGISTER for December 31, 1970 (35 FR 20009) a notice of proposed rulemaking which prescribed the illumination to be provided in the working places of underground coal mines, and in addition, the reflection efficiency of the surfaces on permissible electric face equipment and restrictions on visual impedance and pulsation frequencies of lighting devices installed on such equipment.

In light of written comments, suggestions, and objections submitted to the Director, Bureau of Mines, concerning this notice of proposed standards, and in view of numerous consultation meetings held, in accordance with section 101(c) of the Act, subsequent to the publication of the proposed standards, it was deemed advisable to withdraw the

proposed rulemaking of December 31, 1970, and to propose revised illumination standards.

Therefore, pursuant to the authority vested in the Secretary of the Interior under section 101(a) of the Act, and in accordance with section 317(e), there was published in the FEDERAL REGISTER for Wednesday, October 27, 1971, (36 FR 20607) proposed standards contained in § 75.1719 and §§ 75.1719–1 through 75.1719–4 of Part 75, Title 30, Code of Federal Regulations, setting forth proposed mandatory standards which would: (1) prescribe the illumination to be provided in the working places of underground coal mines; (2) specify requirements for lighting fixtures; (3) provide for methods of measuring light; and (4) specify requirements for mining machines, hard hats, and cap lamps. Interested persons were afforded a period of 45 days within which to submit written comments, suggestions, or objections to the Director, Bureau of Mines.

Written comments, suggestions, and objections stating the grounds for objection and requesting a public hearing on the proposed standards were timely filed with the Director. In accordance with section 101(f) of the Act, a notice of objections filed and hearing requested was published in the FEDERAL REGISTER for Tuesday, February 19, 1974 (39 FR 6118).

Subsequently there was published in the FEDERAL REGISTER for Wednesday, March 6, 1974 (39 FR 8618) a notice of public hearing to be held for the purpose of receiving relevant evidence on the issues raised by the written objections and the grounds for such objections which had been filed in response to the proposed standards published on October 27, 1971 (36 FR 20607). The public hearing was held on April 4, 1974, in the Main Auditorium of the Department of the Interior. The record was held open for twenty-one days to permit submission of additional data and information. A verbatim transcript of the hearing, together with the comments, suggestions, information and data submitted, is available for public inspection in the Office of the Assistant Administrator, Coal Mine Health and Safety, MESA, Department of the Interior, Room 818, 4015 Wilson Boulevard, Arlington, Virginia 22203.

Based on the evidence in written comments, suggestions, data, and information submitted in response to the proposed rulemaking and at the public hearing, findings of fact were made public on June 25, 1974, and were published in the FEDERAL REGISTER for Friday, June 28, 1974 (39 FR 24021).

All comments, suggestions, statements, data, information, and objections submitted in response to the notice of proposed rulemaking of October 27, 1971 (36 FR 20607) and the public hearing have been fully and carefully considered. Modifications of the proposed standards have been made which are described below and in the findings of fact.

1. *§ 75.1719:* As proposed, § 75.1719 merely restated the provisions of section 317(e) of the Act. § 75.1719 has been revised to specifically state the date upon which the standards contained in §§ 75.1719–1 through 75.1719–4 were promulgated in the FEDERAL REGISTER and, without the necessity of referring to other sources when published in the Code of Federal Regulations, to provide and specifically state the date 18 months after promulgation by which mine operators shall provide the required lighting.

2. *§ 75.1719–1:* The proposed § 75.1719–1 has been revised and modified to reflect certain findings of fact and comments and suggestions received in response to the notice of proposed rule making. The major revisions concern the requirement for lighting only while self-propelled mining equipment is operated in a working place; a definition of "self-propelled mining equipment" for the purposes of these standards; a clearer description of the illumination required according to specific types of equipment; and rearrangement and redesignation of proposed provisions for clarity. The revisions, modifications and new provisions are further described below.

§ 75.1719–1(a): As proposed, paragraph (a) required each working place to be illuminated at all times while miners were working in such places. Paragraph (a) has been modified to require illumination of working places only while self-propelled mining equipment is operated in the working place. As stated in the June 25, 1974 findings of fact, this change is made because portable task luminaires or area lighting systems for various nonmachine underground operations (for example, timbering, electrical, pipe, or machine repair) would require frequent repositioning which in many cases increases the miner's exposure to electrical shock, ignition, and other hazards present in working places. Additionally, MESA reports show that almost all serious and fatal accidents in working places occur while self-propelled equipment is operated in such working places. Therefore, illumination of working places while self-propelled mining equipment is not operated in working places will not be required, and such requirements are deleted, pending further study and until further notice is given pursuant to section 101 of the Act. As a result of the modification, the majority of light fixtures can be installed on machines, thereby eliminating the need for the presence of additional miners in working places.

§ 75.1719–1(b): A new paragraph (b) has been added defining "self-propelled mining equipment" for the purpose of clarifying the kinds of equipment which would require that illumination be provided in specified areas of the working place while such equipment is operated in the working place.

§ 75.1719–1 (c) and (d): Proposed paragraphs (b) and (c) have been redesignated paragraphs (c) and (d) respectively.

§ 75.1719–1(e): Proposed paragraphs (d), (e), (f) and (g) of § 75.1719–1 have been revised, modified, rearranged or deleted to more clearly define the areas to be illuminated for specific types of equipment or to conform to findings of fact and have been combined into a new paragraph (e).

Proposed paragraph (e) of § 75.1719–1 required the gob-side of the longwall roof support system to be illuminated. Such a requirement would necessitate installation of light fixtures under unsupported roof which would be extremely hazardous to miners. Proposed paragraph (e) has been redesignated paragraph (e)(4), and since miners do not work or travel on the gob-side of the roof support system, the area required to be illuminated has been changed to include only the area in which miners travel and work, which is the area between the gob-side of the travelway and the side of the block of coal from which coal is being extracted. In addition the control station, the head and tail piece, and the roof and floor for a distance of 5 feet horizontally from the control station, head piece, and tail piece shall be illuminated. Because of the similarity in the methods of mining, the areas to be illuminated in a shortwall working place have been included.

Paragraph (e)(2) has been added to cover the use of self-loading haulage equipment, such as scoops, when used to load materials in the working place. Such equipment is often used to load coal, rock, and other materials into shuttle cars and other types of haulage cars, and onto conveyors and belts. When operated in a working place for purposes other than loading, such equipment will be required to comply with § 75.1719–1 (e)(6).

A new paragraph (e)(5) has been added which covers roof-bolting machines separately from other types of equipment. The distance to which a miner is subjected to rib rolls increases as the distance from the floor to the roof increases. It is, therefore. important that illumination be provided on the ribs so that a miner can see a rib roll developing and take evasive action. Illumination will be required of coal surfaces and exposed surfaces of mining equipment which are within a distance of 5 feet from the roof bolting machine or within a distance equal to the distance from the floor to the roof, whichever is greater. It is the intent of the standards that in working places where the distance from the floor to the roof is 5 feet or less, that when the face or a rib is within 5 feet of the machine that such face and ribs shall be illuminated. It is also intended that the roof over the machine and the roof and floor for a distance of 5 feet surrounding the machine shall be illuminated. A distance of 5 feet will be measured, parallel to the floor, from the rear of the machine, from the sides of the machine, and from the sides and front of the drilling boom. The perimeter of the area on the roof and floor which shall be illuminated will be determined by projecting the 5 foot distance to the floor and roof. In addition, any rib surface, face surface, and exposed surface of mining equipment which is within the 5-foot distance shall be illuminated. Where the distance from the

floor to the roof is more than 5 feet, the distance from the sides of the machine and the sides and front of the drilling boom will be increased to a distance equal to the distance from the floor to the roof, but the distance from the rear of the machines shall be 5 feet. A roof bolting machine is operated throughout the working place at greater distances from the face and ribs than other self-propelled mining equipment. Further, unlike other self-propelled mining equipment, the roof bolting machine has operating controls located at an operator station at the front of the machine. In view of its unique function, the location of operating controls, and movement throughout the working place, the requirement for illumination only within a distance of 5 feet from the machine or a distance equal to the distance from the floor to the roof. whichever is greater, is provided in order to minimize discomfort glare, the presence of which could result in diminution of safety.

Paragraph (e)(6) will require illumination in working places in which other self-propelled equipment is operated, unless the entire working place is illuminated by stationary lighting. Luminaires shall be installed on each machine which shall illuminate a face or rib coal surface which is within 10 feet from the front and rear of the machine; the area of the surface to be illuminated shall equal the height and width of the machine; and the luminaires in the direction of travel shall be in operation at all times the machine is being trammed in the working place.

Proposed paragraph (f) has been deleted in view of the finding of fact that portable task luminaires or area lighting systems for various nonmachine underground operations require frequent repositioning which in many cases increases the miner's exposure to electrical shock and ignition hazards.

Proposed paragraph (g) required that in anthracite mines the area between the face and the full box, and the battery area at and inby the last open crosscut be illuminated. This requirement has been deleted because in anthracite mines self-propelled mining equipment is not normally used between the face and the full box or in the battery area. However, the provisions of § 75.1719–1 requiring illumination of working places while self-propelled mining equipment is operated in such places will be applied to anthracite mines.

§ 75.1719–1(f): as proposed, paragraph (h) provided that an authorized representative of the Secretary may specify other areas in working places to be illuminated. Proposed paragraph (h) has been redesignated paragraph (f) and has been revised to conform to the findings of fact and to provide that the Assistant Administrator, Coal Mine Health and Safety, MESA, may specify other areas in a working place to be illuminated while self-propelled mining equipment is operated in the working place.

§ 75.1719–1(g): Proposed paragraph (f) of § 75.1719–2 has been redesignated paragraph (g) of § 75.1719–1 and has been modified to clarify those surfaces to be illuminated and the surface brightness of such surfaces.

3. *§ 75.1719–2:* The provisions of § 75.1719–2 have been rearranged for clarity, content of subject matter, and ease of use. Revisions have been made and several new provisions have been added. The rearrangement, revisions and new provisions are described below.

§ 75.1719–2(a): The second sentence of paragraph (a) is redesignated paragraph (c)(1).

§ 75.1719–2(b): A new paragraph (b) has been added to specifically provide for the use of either machine-mounted or stationary lighting fixtures.

§ 75.1719–2(c): The provisions of § 75.1719–2(c) have been rearranged and contain the provisions of the second sentence of proposed § 75.1719–2(a) and revisions of proposed § 75.1719–2(b).

Paragraph (c)(2) contains revisions of the first sentence of proposed paragraph (b) providing more specific approved methods of grounding of stationary light fixtures and a maximum allowable fault current is specified to prevent electrical burns to miners handling energized stationary light fixtures.

Paragraph (c)(3) contains revisions of the second sentence of proposed paragraph (b) which has been modified to require that the frames of machine-mounted light fixtures be grounded to the machine only by a separate grounding conductor in compliance with § 75.701–4. This method of grounding is necessary in order to assure an adequate grounding circuit, because light fixtures installed on a machine are occasionally broken loose from the frame of the machine which allows an internal ground fault inside the enclosure to become a shock and/or an ignition hazard.

§ 75.7119–2(d): A new paragraph (d) has been added limiting to 300 volts the amount of voltage that can be used to supply power to stationary light fixtures which can be carried by hand while energized. Extremely dangerous shock hazards exist in handling portable equipment energized at a voltage greater than 300 volts. This hazard is also recognized in 30 CFR Part 18 which limits the voltage of hand-held tools to 300 volts.

§ 75.1719–2(e): Paragraph (e) contains the provisions of proposed paragraph (c) which has been modified to specify a maximum allowable amount of fault current setting which may be used to deenergize the circuit.

§ 75.1719–2(f): Paragraph (f) contains the provisions of proposed paragraph (d). Modifications have been made for clarity and to allow light fixtures to be protected by means other than removal for a specified distance from the blasting operation. This change was made to provide flexibility in the protection of light fixtures without diminution of safety, particularly for longwall operations. For example, the standard as proposed required light fixtures to be removed from the entire longwall face during blasting operations.

§ 75.1719–2(g): Paragraph (g) contains the provisions of the first sentence of proposed paragraph (e). The second sentence of proposed paragraph (e) has been deleted because experiments have shown that a light spread exceeding 170° does not cause glare if the light fixtures are properly oriented. However, paragraph (g) continues the requirement that lighting fixture systems shall be designed and installed to minimize discomfort glare.

4. *§ 75.1719–3:* Proposed § 75.1719–3 has been rearranged, revised and modified as explained below.

§ 75.1719–3(a): Proposed paragraph (a) provided that illumination levels could be determined by measuring surface brightness or incident light. Paragraph (a) has been modified to limit measurement of only luminous intensity (surface brightness). Incident light measurements have been deleted because at the present time technical problems exist in determining the reflectance value of rough and irregular surfaces under actual mining conditions. Paragraph (a) has been further modified to state clearly that the method of measurement in § 75.1719–3 is intended as prescribing the manner in which luminous intensity measurements will be made by MESA. The requirement that telescopic photosensors or visual photometers be used as instruments to measure light has also been deleted in order to allow for the use of a variety of existing instruments or others which may be developed in the future.

§ 75.1719–3(b): A new paragraph (b) has been added providing for standardization of light measuring procedures from mine to mine depending upon the areas of working places required to be illuminated. Paragraph (b) also combines provisions of proposed paragraphs (c) and (d) with revisions and modifications. The modifications provide for a more practical and enforceable method of light measurement. In addition, for the purpose of clarity, methods of measuring luminous intensity are depicted by figures in paragraphs (b)(5) and (b)(7).

§ 75.1719–3(c): A new paragraph (c) has been added to permit measurements to be made without hazard to an authorized representative of the Secretary under conditions which reflect as near as practicable the conditions surrounding the actual use of a machine. Temporary support may be required but at other times it may be more expedient to move a machine to a similar working place in which permanent roof supports have been installed.

§ 75.1719–3(d): Proposed paragraph (b) has been redesignated paragraph (d). The reference to Figure 4–5 in the "Illuminating Engineering Society Handbook, 4th Ed.," has been changed to the Commission Internationale de l'Eclairage (CIE) Spectral Luminous Curve. The CIE Spectral Luminous Curve is set forth for convenience and ready availability to assist in color correction of the instruments.

5. *§ 75.1719–4:* Paragraph (a) has been modified to provide that the paint on exterior surfaces of mining machines shall have a minimum reflectance of 30

percent, instead of 50 percent, in order to permit the use of common types of readily available protective paints and materials.

Paragraphs (b) and (d) have been modified to specify minimum sizes for reflectors or reflecting tape on mining machines, and reflecting tape, or equivalent paint, or material on hard hats or hard caps.

TEST AND EVALUATION OF ILLUMINATION SYSTEMS

The Mining Enforcement and Safety Administration (MESA) recognizes the complexity of making underground illumination measurements and evaluating illumination systems. Illumination of working places in underground mines is a relatively new and innovative safety measure, although practical lighting fixtures (stationary and machine-mounted) have been developed which will illuminate the working places to 0.06 foot-lamberts. Such lighting fixtures have been tried under actual mining conditions and at various coal-bed heights and have been found acceptable to both operators and miners. It is also recognized that a scarcity of illumination engineering expertise exists in the coal industry and in the mining equipment and mine lighting fixture industries. Therefore, in order to facilitate design and installation of illumination systems and to expedite compliance with sections 75.1719 through 75.1719–4 of Part 75, 30 CFR, MESA will provide technical assistance to coal mine operators, mining equipment manufacturers, and lighting fixture manufacturers in their efforts to design and install illumination systems.

The attention of mine operators and equipment manufacturers is directed to a Notice published in this issue of the FEDERAL REGISTER at page 14108 which states where and how technical assistance may be obtained from MESA and the test and evaluation of illumination systems. Requests should be made in writing to the Assistant Administrator—Technical Support, MESA, Ballston Towers No. 3, Room 917, 4015 Wilson Boulevard, Arlington, Virginia 22203.

Mine operators, and equipment and lighting fixture manufacturers, are not required to submit lighting systems for test and evaluation. An approval plate or label will not be issued by MESA, nor will such a plate or label be required on lighting systems which have been tested and evaluated. MESA will, however, issue a Statement of Test and Evaluation which will define the parameters within which the illumination system can be operated to provide the required light. For example, the Statement of Test and Evaluation will state the maximum height of the working place, the maximum width of the working place, the type and model of machine (if machine mounted), and location and orientation of light fixtures, and other conditions under which the equipment may be operated to provide the required light.

It is intended that if lighting systems are installed and a machine is operated within the conditions and parameters set forth in the Statement of Test and Evaluation the operator will be considered by MESA as being in compliance with the requirements of the standards. However, if the lighting system is not installed or the machine is not operated within the conditions and parameters stated, light measurements shall be made in accordance with the procedures specified in the regulations to determine whether the required light is provided and whether a violation exists.

Upon written application and payment of fees MESA will test and evaluate lighting systems in a mine or in a simulated working place. Tests may be made on a machine or on a mockup of a machine upon which it is intended to install the lighting system.

Part 75, Title 30, Code of Federal Regulations is amended and revised as set forth below.

Effective Date: These revisions and amendments shall be effective on ----------.

It is hereby certified that the economic and inflationary impacts of these regulations have been carefully evaluated in accordance with OMB Circular A–107.

Part 75 of Title 30, Code of Federal Regulations, is amended by revising § 75.1719 and by adding new §§ 75.1719–1 through 75.1719–4 as follows:

§ 75.1719 Illumination; purpose and scope of §§ 75.1719 through 75.1719–4; time for compliance.

(a) Section 317(e) of the Act (30 U.S.C. 877(e)) directs and authorizes the Secretary to propose and promulgate standards under which all working places in a mine shall be illuminated by permissible lighting while persons are working in such places. §§ 75.1719 through 75.1719–4 prescribe the requirements for illumination of working places in underground coal mines while persons are working in such places and while self-propelled mining equipment is

(b) Section 317(e) further provides that all working places in a mine shall be illuminated within eighteen months after the promulgation of the standards. §§ 75.1719 through 75.1719–4 were published and promulgated in the FEDERAL REGISTER on ----------. Mine operators shall comply with §§ 75.1719 through 75.1719–4 not later than ----------.

§ 75.1719–1 Illumination in working places.

(a) Each operator of an underground coal mine shall provide each working place in the mine with lighting as prescribed in §§ 75.1719–1 and 75.1719–2 while self-propelled mining equipment is operated in the working place.

(b) Self-propelled mining equipment; definition. For the purposes of §§ 75.1719 through 75.1719–4, "self-propelled mining equipment" means equipment which possesses the capability of moving itself or its associated components from one location to another by electric, hydraulic, pneumatic, or mechanical power supplied by a source located on the machine or transmitted to the machine by cables, ropes, or chains.

(c) The lighting prescribed in this section shall be in addition to that provided by personal cap lamps.

(d) The luminous intensity (surface brightness) of surfaces that are in a miner's normal field of vision of areas in working places that are required to be lighted shall be not less than 0.06 foot-lamberts when measured in accordance with § 75.1719–3.

(e) When self-propelled mining equipment specified in paragraphs (e)(1) through (e)(6) of this section is operated in a working place, the areas within a miner's normal field of vision which shall be illuminated in the working place shall be as prescribed in paragraphs (e)(1) through (e)(6) of this section.

(1) *Continuous miners and coal-loading equipment.* In working places in which continuous miners and coal-loading equipment are operated, the areas which shall be illuminated shall be as follows:

(i) The face, and

(ii) The ribs, roof, floor, and exposed surfaces of mining equipment, which are between the face and the inby end of the shuttle car or other conveying equipment while in position to receive material.

(2) *Self-loading haulage equipment used as a loading machine.* In working places in which self-loading haulage equipment is operated to load material, the areas which shall be illuminated shall be as follows:

(i) The face, and

(ii) The ribs, roof, floor, and exposed surfaces of mining equipment, which are between the face and a point 5 feet outby the machine.

(3) *Cutting and drilling equipment.* In working places in which cutting or drilling equipment is operated, the areas which shall be illuminated shall be as follows:

(i) The face, and

(ii) The ribs, roof, floor, and exposed surfaces of mining equipment, which are between the face and a point 5 feet outby the machine.

(4) *Shortwall and longwall mining equipment.* In working places in which shortwall or longwall mining equipment is operated, the areas which shall be illuminated shall be as follows:

(i) The area for the length of the self-advancing roof support system and which is between the gob-side of the travelway and the side of the block of coal from which coal is being extracted, and

(ii) The control station, and the head piece and tail piece of the face conveyor, and

(iii) The roof and floor for a distance of 5 feet horizontally from the control station, head piece and tail piece.

(5) *Roof bolting equipment.* In working places in which roof bolting equipment is operated, the areas which shall be illuminated shall be as follows:

(i) *where the distance from the floor to the roof is 5 feet, or less:* the face, ribs, roof, floor, and exposed surfaces of mining equipment, which are within an area the perimeter of which is a dis-

tance of 5 feet from the machine, when measured parallel to the floor.

(ii) *where the distance from the floor to the roof is more than 5 feet:* the face, ribs, roof, floor, and exposed surfaces of mining equipment, which are within an area the perimeter of which from the front and sides of the machine is a distance equal to the distance from the floor to the roof and from the rear of the machine a distance of 5 feet, when measured parallel to the floor.

(6) *Other self-propelled equipment.* Unless the entire working place is illuminated by stationary lighting equipment, in working places in which self-propelled equipment is operated, other than equipment specified in paragraphs (e)(1) through (e)(5) of this section, illumination shall be provided as follows:

(i) Luminaires shall be installed on each machine operated in the working place which shall illuminate a face or rib coal surface which is within 10 feet of the front and the rear of the machine to a luminous intensity of not less than 0.06 footlamberts, and

(ii) The height and width of the area of the coal surface which shall be illuminated shall equal the height and width, respectively, of the machine on which the luminaires are installed, and

(iii) The luminaires in the direction of travel shall be operated at all times the equipment is being trammed in the working place.

(f) The Assistant Administrator, Coal Mine Health and Safety, MESA, may specify other areas in a working place to be illuminated for the protection of miners while self-propelled mining equipment is being operated in the working place.

(g) Surface brightness of floor, roof, coal and machine surfaces in the normal visual field of a miner shall not vary more than 50 percent between adjacent fields of similar surface reflectance, and the maximum surface brightness of such surface shall not exceed 120 footlamberts, which measured in accordance with § 75.1719–3.

§ 75.1719–2 Lighting fixtures; requirements.

(a) Lighting fixtures shall be permissible.

(b) Lighting fixtures may be installed on self-propelled machines or may be stationary lighting fixtures.

(c)(1) Electrically operated lighting fixtures shall be energized by direct current, or by sinusoidal full wave alternating current not less than 50 cycles per second (100 pulses per second), or by an equivalent power source that causes no greater flicker.

(2) Alternating current circuits supplying power to stationary lighting fixtures shall contain conductors energized, at voltages not greater than 70 volts to ground. Alternating current circuits, energized at 100 volts or more and used to supply power to stationary lighting fixtures, shall originate at a transformer having a center or neutral tap grounded to earth through a proper resistor, which shall be designed to limit fault current to not more than 5 amperes. A grounding circuit in accordance with § 75.701–4 shall originate at the grounded terminal of the grounding resistor and extend along with the power conductors and serve as a grounding conductor for the frames of all equipment receiving power from the circuit. The ground fault current rating of grounding resistors shall meet the "extended time rating" set forth in the Institute of Electrical and Electronics Engineers, Inc. Standard No. 32 (IEEE Std. 32–1972) which is hereby incorporated by reference and made a part hereof. The incorporated publication is available for examination at each Coal Mine Health and Safety District and Subdistrict Office of MESA, and may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, N.Y. 10017.

(3) Machine-mounted lighting fixtures shall be electrically grounded to the machine by a separate grounding conductor in compliance with § 75.701–4.

(d) Direct current circuits in excess of a nominal voltage of 300 volts shall not be used to supply power to stationary light fixtures.

(e) Cables conducting power to stationary lighting fixtures from both alternating and direct current power sources, other than intrinsically safe devices, shall be considered trailing cables, and shall meet the requirements of Subpart G of this part. In addition, such cables shall be protected against overloads and short circuits by a suitable circuit breaker or other device approved by the Secretary. Circuit breakers or other device approved by the Secretary protecting trailing cables receiving power from resistance grounded circuits shall be equipped with a ground trip arrangement which shall be designed to deenergize the circuit at not more than 50% of the available fault current.

(f) Before shunts are removed from blasting caps, lighting fixtures and associated cables located in the same working place shall be deenergized. Furthermore, lighting fixtures shall be removed out of the line of blast and not less than 50 feet from the blasting operation unless otherwise protected against flying debris.

(g) Lighting fixtures shall be designed and installed to minimize discomfort glare.

§ 75.1719–3 Methods of measurement; light measuring instruments.

(a) Compliance with § 75.1719–1(d) shall be determined by MESA by measuring luminous intensity (surface brightness).

(b) In measuring luminous intensity the following procedures shall be used:

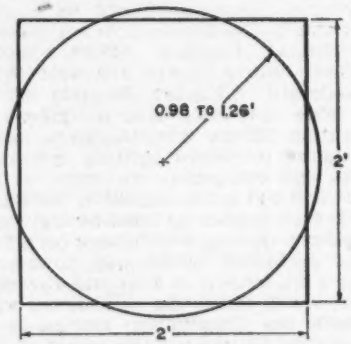
(1) In areas of working places specified in §§ 75.1719–1(e)(1) through 75.1719–1(e)(3) luminous intensity measurements of the face, ribs, roof, floor, and exposed surfaces of mining equipment, shall be made with the machine idle and located in the approximate center of the working place with the cutting, loading, or drilling head toward the face and not more than 3 feet from the face.

(2) In areas of working places specified in § 75.1719–1(e)(4) luminous intensity measurements may be made at any time longwall or shortwall mining equipment is operated except that when measurements are made in the vicinity of shearers, plows, or continuous miners, the equipment shall be idle while measurements are being made.

(3) In areas of working places specified in § 75.1719–1(e)(5) luminous intensity measurements of the face, ribs, roof, floor, and exposed surfaces of mining equipment, shall be made with the machine idle and located in the approximate center of the working place with the drilling head toward the face and a distance from the face of 5 feet, or the distance from the floor to the roof, whichever is applicable. When the machine is located in the center of the working place and the surfaces of the ribs to be illuminated are not within the perimeter of the area determined in accordance with § 75.1719–1(e)(5), the machine shall be positioned the applicable distance from the face and each rib and luminous intensity measurements made for each rib, provided, however, that luminous intensity measurements may be made of the face, roof, floor, and exposed surfaces of mining equipment with the machine so located without locating the machine in the center of the working place.

(4) In areas of working places specified in § 75.1719–1(e)(6), luminous intensity measurements of a coal surface shall be made with the machine idle and located in the approximate center of the working place with the appropriate end toward the face and not less than 9 feet nor more than 10 feet from the face.

(5) The area of surfaces to be measured shall be divided into round or square fields having an area of not less than 3 nor more than 5 square feet as illustrated by the following figure:

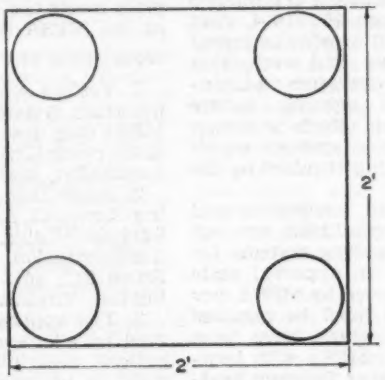


DIRECT MEASUREMENT OF LUMINOUS INTENSITY

(6) Measurements shall be taken with the photometer held approximately perpendicular to the surface being measured and a sufficient distance from the surface to allow the light sensing element in the instrument to receive reflected light from a field of not less than 3 nor more than 5 square feet. The lumi-

nous intensity of each such field shall be not less than 0.06 footlamberts.

(7) In areas of working places where clearances are restricted to the extent that the photometer cannot be held a sufficient distance from the surface to allow the light sensing element in the instrument to receive reflected light from a field having an area of at least 3 square feet, luminous intensity shall be considered as the average of four uniformly spaced readings taken at the corners and within a square field having an area of approximately 4 square feet. In such instances, the area of each of the individual readings shall not exceed 100 square inches. The average of the four readings shall not be less than 0.06 footlamberts. The method of measurement is illustrated by the following figure:



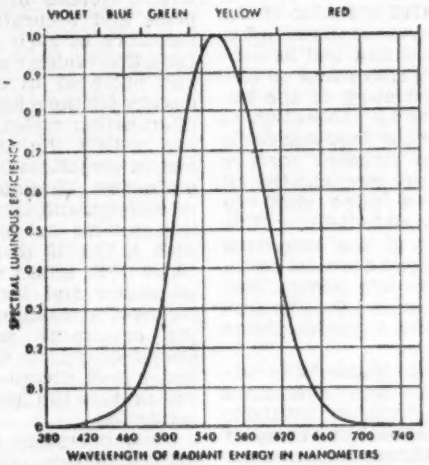
DETERMINATION OF LUMINOUS INTENSITY BY AVERAGING METHOD

(8) Measurements shall not be made where shadows are cast by roof control posts, ventilation equipment, or other obstructions necessary to insure safe mining conditions.

(9) Where machine-mounted light fixtures are used on equipment, except self advancing roof support systems, measurements shall not be made of surfaces on or within 1 foot of a self-propelled machine.

(c) For the purpose of making illumination measurements, an authorized representative of the Secretary may require the installation of temporary roof supports or the removal of the equipment to a similar working place in which permanent roof supports have been installed.

(d) Light measuring instruments shall be properly calibrated and maintained. Instruments shall be calibrated against standards traceable to the National Bureau of Standards and color corrected to the Commission Internationale de l'Eclairage (CIE) Spectral Luminous Curve. The CIE Spectral Luminous Curve is as follows:



§ 75.1719–4 Mining machines, cap lamps; requirements.

(a) Paint used on exterior surfaces of mining machines shall have a minimum reflectance of 30 percent, except cab interiors and other surfaces which might adversely affect visibility.

(b) When stationary light fixtures are used, red reflectors mounted in protective frames or reflecting tape shall be installed on each end of mining machines, except that continuous mining machines, loaders, and cutters need only have such reflectors or tape on the outby end. Reflectors or reflecting tape shall have an area of not less than 10 square inches.

(c) Each person who goes underground shall be required to wear an approved personal cap lamp or an equivalent portable light.

(d) Each person who goes underground shall be required to wear a hard hat or hard cap which shall have a minimum of 6 square inches of reflecting tape or equivalent paint or material on each side and back.

(Secs. 101, 317(e) Pub. L. 91–173, 83 Stat. 745, 788 (30 U.S.C. 811, 877(e)).)

[FR Doc.76–8892 Filed 3–31–76;8:45 am]

DEPARTMENT OF THE INTERIOR

Mining Enforcement and Safety Administration

UNDERGROUND COAL MINES

Testing and Evaluation of Illumination Systems

Concurrent with this Notice there is published in this issue of the FEDERAL REGISTER at page 14102 a Notice of the date on which standards for illumination in underground coal mines will be promulgated. The Notice states that on October 1, 1976, the Secretary of the Interior will promulgate by publication in the FEDERAL REGISTER the final standards under which within eighteen months after the standards are promulgated all working places in a mine shall be illuminated by permissible lighting. The form and substance of the standards which will be promulgated are set forth, and interested persons are advised that the standards are firm and that no further change or revision is contemplated or intended.

The purpose of this Notice is to advise mine operators and equipment manufacturers of services available through the Illumination Laboratory of Technical Support, Mining Enforcement and Safety Administration (MESA), Beckley, West Virginia, in order to facilitate design and installation of illumination systems and to expedite compliance with §§ 75.1719 through 75.1719–4 of Part 75, Title 30, Code of Federal Regulations. Testing and evaluation of illumination systems will be made to determine whether, or in what manner, the system will meet the final standards which are to be promulgated. The procedures state how a Statement of Test and Evaluation will be used by a mine inspector in determining compliance with the illumination standards.

The procedures for obtaining assistance and the test and evaluation of illumination systems by Technical Support, Mining Enforcement and Safety Administration, are set forth below.

Dated: March 24, 1976.

WILLIAM L. FISHER,
Assistant Secretary of the Interior.

PROCEDURES FOR TESTING AND EVALUATION OF ILLUMINATION SYSTEMS

By a Notice published in the FEDERAL REGISTER the Secretary of the Interior has established October 1, 1976 as the date upon which final regulations pertaining to illumination of underground working places will be promulgated. The Notice sets forth the regulations which will be contained in §§ 75.1719 through 75.1719–4 of Part 75, Title 30, Code of Federal Regulations.

PURPOSE

The purpose of these Procedures is to advise mine operators and equipment manufacturers of services available through the Illumination Laboratory of Technical Support, MESA, Beckley, West Virginia. The Mining Enforcement and Safety Administration recognizes the complexity of making underground illumination measurements and evaluating illumination systems. It is also recognized that a scarcity of illumination engineering expertise exists in the coal mining industry and in the mining equipment manufacturing industry. MESA is convinced, however, that the technology exists exists to test and evaluate illumination systems in a simulated working place and accurately predict the performance of such systems prior to installation underground if installed, used, and operated in accordance with the designs for the machines upon which the illumination systems are to be installed and within the conditions and parameters established through testing and evaluation. Therefore, in order to facilitate design and installation of illumination systems and to expedite compliance with §§ 75.1719 through 75.1719–4, Part 75, 30 CFR, MESA will provide technical assistance and testing and evaluation services for coal mine operators and mining equipment and lighting fixture manufacturers in their efforts to design and install illumination systems which will provide the lighting required by the regulations.

Mine operators and equipment and lighting fixture manufacturers are not required to submit lighting systems for test and evaluation. An approval plate or label will not be issued by MESA, nor will such a plate or label be required on lighting systems which have been tested and evaluated. MESA will, however, issue a Statement of Test and Evaluation which will define the conditions and parameters determined by the test and evaluation within which the illumination system can be operated to provide the required light.

It is intended that if lighting systems are installed and a machine is operated within the conditions and parameters set forth in the Statement of Test and Evaluation, the operator will be considered by MESA as being in compliance with the requirements of the standards. However, if the lighting system is not installed or the machine is not operated within the conditions and parameters stated, light measurements shall be made in accordance with the procedures specified in the regulations to determine whether the required light is provided and whether a violation exists. The mine inspector will inspect lighting systems that have been tested and evaluated to determine if the lighting system, in all respects, conforms to the Statement of Test and Evaluation; whether changes or modifications have been made in the lighting system; whether one or more lights are not working; and whether the illumination system is being operated and used within the conditions and parameters specified in the Statement of Test and Evaluation.

IN-MINE ASSISTANCE, TEST AND EVALUATION

Upon written request of a coal mine operator, MESA will test and evaluate installed illumination systems in working places in a mine.

SIMULATED WORKING PLACE, TEST AND EVALUATION

MESA will test and evaluate both machine-mounted and stationary illumination systems for coal mine operators and mine equipment manufacturers in a simulated working place prior to installation underground.

MESA may require that the applicant make available a machine or mock-up of a machine for testing and evaluation of the illumination system or such mock-up may be built by MESA.Testing and evaluation in a simulated working place will be performed by the Illumination Laboratory of Technical Support, MESA, Beckley, West Virginia. Testing and evaluation also may be performed at a simulated working place furnished by an applicant, provided such simulated working place meets the same, or greater, criteria as the MESA simulated working place.

APPLICATION FOR TESTING AND EVALUATION

1. Testing and evaluation of an illumination system will be undertaken by MESA only upon written application and after receipt of the deposit for fees as hereinafter specified.

2. Applications shall be submitted to the Assistant Administrator—Technical Support, Mining Enforcement and Safety Administration, Ballston Towers No. 3, Room 917, 4015 Wilson Boulevard, Arlington, Virginia 22203.

3. The application shall be accompanied by all necessary drawings, specifications, descriptions, and related materials, as hereinafter specified.

a. *Machine-mounted illumination systems.* Applications for test and evaluation of machine-mounted illumination systems shall be accompanied by all necessary drawings and specifications, including drawings of the machine showing the location and orientation of all components of the illumination system and the overall dimensions of the machine.

b. *Stationary illumination systems.* Applications for test and evaluation of stationary illumination systems shall be accompanied by all necessary drawings and specifications, including drawings of the working place showing the location and orientation of all components of the illumination system and a description and list of the types and models of all equipment to be operated in the working place.

c. *Drawings and specifications.* (1) All drawings and specifications shall be submitted in triplicate.

(2) Drawings and specifications shall be in sufficient detail to identify fully the complete assembly, component parts, and subassemblies. Drawings shall be titled, numbered, dated and shall show the latest revision. Each drawing shall include a warning statement that changes in design which have not been authorized by MESA shall be considered by MESA as causing such modified illumination system to be out of compliance with the STE. When intrinsically safe circuits are incorporated into an illumination system, the wiring diagram shall include a warning statement that

any changes in the intrinsically safe circuitry or components may result in an unsafe condition. The specifications shall include an assembly drawing showing the overall dimensions of the machine and the location of each component part of the illumination system. Purchased parts shall be identified by the manufacturer's name, catalog number and rating. All drawings of component parts submitted to MESA shall be identical to those used in the manufacture of the parts.

4. Only complete illumination systems will be tested and evaluated.

5. Illumination systems that include one or more nonexplosion-proof components will not be tested and evaluated unless such components contain intrinsically safe circuits.

FEES AND COSTS

1. Applicants shall be responsible for and pay all packaging, crating, shipping, freight, and delivery charges necessary to deliver a machine, mock-up of a machine, or illumination system to the MESA test and evaluation site and return to the applicant upon completion of the test and evaluation. The applicant shall furnish at its own expense necessary personnel to assemble and disassemble machines, mock-ups, and illumination systems to be tested and evaluated.

2. MESA may require the assistance of the applicant or agents and employees of the applicant during the assembly, disassembly, or preparation of a machine, mock-up of a machine, or illumination system. or in the operation of a machine or illumination system during testing and evaluation. Only necessary government personnel, persons assisting as provided in this paragraph, and such other persons as are requested by MESA or the applicant to be observers, shall be present during the testing and evaluation of the illumination system under consideration. The salaries or wages of the applicant's agents, employees, or observers shall be paid by the applicant. Such agents, employees, and observers shall be deemed to be, and remain at all times, employees of the applicant who shall assume full responsibility and liability for damages that may arise out of their employment on the project, and shall carry all necessary and suitable liability and compensation insurance and make payroll deductions on their account.

Each party shall be responsible for its own acts and the results thereof and shall not be responsible for the acts of the other party and the results thereof. Each party shall assume all risk and liability to itself, its agents or employees for any injury to persons or property resulting from the conduct of its own operations and the operations of its agents, employees, or observers, and for any loss, cost, damage, or expense resulting from and due to any act or acts, negligence. or the failure to exercise proper precautions, or by itself or by its own agents, employees, or observers, while occupying or visiting the test and evaluation site.

3. *Fees.* An applicant shall pay for services involved in the testing and evaluation of an illumination system a fee which shall be determined as follows:

a. The fee shall be an hourly rate based on the most recent rate of basic pay in the General Schedule (GS) contained in Section 5332(a) of Title 5, United States Code, adjusted in accordance with Subchapter I of Chapter 53 of Title 5, U.S.C. The hourly rate shall be determined upon the salaries of the following classes of employees only and shall be determined in the following manner:

An Engineer: Grade GS–12, step 1.
A Technician: Grade GS–7, step 1.
Clerical Personnel: Grade GS–4, step 1.

b. There shall be added to the hourly rate an 8½ percent increment for personal benefits.

4. *Other costs and charges.* When testing and evaluation is performed at locations other than MESA's premises, the applicant shall reimburse MESA for traveling, subsistence and incidental expenses of MESA's representative(s) in accordance with Standardized Government Travel Regulations. Such reimbursement shall be in addition to the hourly fee charged for testing and evaluation.

5. *Deposit and payment of fees and charges.* a. An applicant may consult with MESA in advance of the submission of an application for testing and evaluation to determine the estimated fees and charges which will be required. The applicant may deposit the estimated amount with MESA at the time the application is submitted to the Assistant Administrator—Technical Support.

b. An applicant may submit an application to the Assistant Administrator—Technical Support without a deposit of fees and other charges. Upon receipt of the application, the Assistant Administrator—Technical Support will examine and review the application and determine the estimated amount of fees and other charges which will be required to perform the test and evaluation. The Assistant Administrator—Technical Support will advise the applicant the estimated amount of fees and charges which shall be deposited.

c. Payment or deposit of fees and other charges shall be made by a check, bank draft, or money order, payable to Mining Enforcement and Safety Administration.

d. MESA may from time-to-time require the deposit of additional funds when during the performance of testing and evaluation the amounts on deposit are found to be insufficient to complete such testing and evaluation.

e. No testing and evaluation will be performed until the estimated fees and charges are deposited nor will further testing and evaluation be performed until additional funds are deposited when required.

f. Any funds deposited with MESA that exceed the fees and charges required to be paid will be refunded at the completion of the testing and evaluation, or applied to future testing and evaluation, as directed by the applicant.

STATEMENT OF TEST AND EVALUATION

1. A Statement of Test and Evaluation will be issued for machine-mounted or stationary illumination systems that are tested and evaluated.

2. Upon completion of the test and evaluation of an illumination system, MESA will issue to the applicant a Statement of Test and Evaluation. The Statement will set forth the conditions and parameters under which the illumination system has been found to provide the light required by the regulations. Conditions and parameters that will be specified in the Statement will include, but not limited to:

The maximum height of the working place,
The maximum width of the working place,
The type and model of machine, if machine-mounted,
The location and orientation of light fixtures.

3. The Statement will identify the illumination system tested and evaluated and will be accompanied by the drawings and specifications (and lists thereof) and related material, covering the design and construction of the illumination system and equipment upon which the test and evaluation is based. Applicants shall keep such drawings, specifications, and related materials that relate to the illumination system tested and evaluated. The drawings and specifications shall be adhered to in production, installation, maintenance and use of the illumination system in order to maintain its classification as being in compliance with the requirements of the standards.

4. If the applicant requests that the illumination system be tested and evaluated to determine the maximum height and width of the working place in which the illumination system can be used to provide the required light, the Statement shall specify the maximum height and width which was determined.

If the applicant requests that the illumination system be tested and evaluated to determine whether the illumination system will provide the required light in working places of heights and widths specified by the applicant, the Statement shall specify whether or not the illumination system provides the required light. The Statement will be accompanied with details of the deficiencies with recommendations for possible correction of the illumination system.

CHANGES OR MODIFICATIONS OF A TESTED AND EVALUATED ILLUMINATION SYSTEM

If an applicant desires to change any feature of an illumination system for which a Statement of Test and Evaluation has been issued, he may request MESA's concurrence by filing an application for such change or modification in accordance with the following procedures:

1. The application shall be submitted as an original application for test and

evaluation, with a request for a modification of the original Statement to cover the proposed modification or change.

2. The application shall be accompanied by appropriate drawings, specifications, and related information, showing the proposed modifications for changes in detail.

3. The application, together with the accompanying material, will be examined by MESA to determine whether inspection or testing and evaluation of the modified illumination system will be required.

4. If testing and evaluation is not required, or if testing and evaluation is performed, a supplementary Statement of Test and Evaluation will be issued, accompanied by the new or revised drawings or specifications (and lists thereof), and new or revised conditions or parameters, if any, which shall be applicable.

CRITERIA FOR TESTING AND EVALUATION OF ILLUMINATION SYSTEMS IN A SIMULATED WORKING PLACE USING SURFACE BRIGHTNESS MEASUREMENTS

A. *General.* A simulated working place shall be constructed in such a manner so as to exclude all exterior light and the interior surfaces shall be uniformly diffused and have a reflectance value not greater than five percent. The ceiling and sides may be constructed so that they are adjustible.

B. *Testing and Evaluation of Machine-Mounted or Stationary Illumination Systems using Surface Brightness Measurements.* 1. The illumination system shall be installed in the simulated working place in accordance with the drawings and specifications submitted in the application for testing and evaluation.

2. The ceiling and sides of the simulated working place shall be adjusted to their maximum height and width, or to the height and width specified by the applicant.

3. The illumination system shall be energized and allowed a warm-up period.

4. Luminous intensity measurements shall be performed as prescribed in 30 CFR 75.1719–3.

5. The luminous intensity of all surfaces required to be illuminated by 30 CFR 75.1719–1 shall be at least 0.06 footlamberts when adjusted by the following formula:

$$\frac{\text{Reflectance of underground surface (0.02)}}{\text{Reflectance of simulated working place surface}} \times \text{Light loss factor (0.77)} \times \text{Average footlambert measurement for a field} \geq 0.06 \text{ fL}$$

6. Where the luminous intensity of any field is found to be less than 0.06 footlamberts, when possible, the height and/or the width of the simulated working place shall be decreased until the luminous intensity of all surfaces required to be illuminated by 30 CFR 75.1719–1 is at least 0.06 footlamberts, as adjusted by the formula in paragraph B.5. of these criteria. The decreased height and/or decreased width at which compliance with the required luminous intensity of 0.06 footlamberts is achieved shall be specified as the maximum allowable height and/or width in the Statement of Test and Evaluation.

CRITERIA FOR TESTING AND EVALUATION OF ILLUMINATION SYSTEMS IN A SIMULATED WORKING PLACE AND IN WORKING PLACES OF UNDERGROUND COAL MINES USING INCIDENT PHOTOMETERS

A. *General.* A simulated working place shall be constructed in such a manner so as to exclude all exterior light, and the surface of the interior ceiling, walls, and floor of a simulated working place shall have reflectance value of not greater than five percent. The ceiling and sides may be constructed so that they are adjustable.

B. *Testing and Evaluation of Machine-Mounted or Stationary Illumination Systems using Incident Light Measurements.* 1. The illumination system shall be installed in the simulated working place or in a working place of an underground coal mine in accordance with the drawings and specifications submitted in the application for testing and evaluation.

2. The illumination system shall be energized and allowed a warm-up period.

3. Incident light for each 4-square-foot field shall be considered as the average of four uniformly spaced measurements taken at the corners of the field.

4. Measurements will be taken for all areas to be illuminated, using an incident photometer. Footcandle averages for each field shall be adjusted by the following formula:

$$\text{Average footcandle measurement for a field} \times \text{Light loss factor (0.77)} \times \text{Reflectance of underground surface (0.02)} \geq 0.06 \text{ fL}$$

5. The luminous intensity of all surfaces required to be illuminated by 30 CFR 75.1719–1 shall be at least 0.06 footlamberts when adjusted by the formula in B.4. of these criteria.

[FR Doc.76–8893 Filed 3–31–76;8:45 am]